Light and Lighting

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Light and Lighting

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Vol. XXXIII.—No. 1 **January, 1940** PRICE NINEPENCE Subscription 10/6 per annum, post free

Principal Contents:

"Well Worth While" or "Too Dim and Too Dear"?

"WELL Worth While"—this was a pretty general verdict from public lighting engineers last month, after hearing a full explanation of the Specification of War-Time Street Lighting and inspecting experimental installations.

Since then the public has had some experience of this new "Synthetic Starlight" in Westminster and elsewhere, and Local Authorities have been counting the cost. There is some disposition to replace "Well Worth While" by "Too Dim and Too Dear."

Nevertheless we believe that in this instance second thoughts will not prove best and that the original verdict will stand.

Authorities who are spending considerable sums on sandbag protection should not grudge the cost of rendering them visible—nor of providing sufficient light to enable costly A.R.P. motor transport to operate in comparative safety. Nor is it essential to replace *every* light in *every* city.

In the long run the views of ratepayers will make themselves felt. They are not prepared to endure total obscurity when neighbouring areas are lighted, especially in view of the mounting casualties after dark. Moreover, they have at least the satisfaction of knowing that the system is the best that science can contrive—that the very best use is being made of the meagre amount of light which the Authorities feel can be safely permitted.

This Twilight

Since the dramatic announcement of Sir John Anderson last month Londoners have had a little experience of the so-called "synthetic starlight" in the vicinity of Westminster and elsewhere under a fair variety of night conditions—though, at the time of writing there has not been any night *really black* enough to reveal its full qualities. There can, one would think, be no doubt about the benefit of even this low order of illumination, as compared with complete obscurity. On a moonless night a walk in the vicinity of Victoria-street is an experience very different from that on some occasions in the past. It is in the side streets, where there are few motor headlights or traffic signs in evidence, that the difference is most marked. But even in Whitehall, at times of busy traffic, the fundamental low level of brightness enables the extra light from vehicles to "build up" to a remarkable extent so that this casual light becomes much more valuable to the pedestrian. The dim lighting now allowed in shop windows is, one hopes, of some value to the shopkeeper—it is certainly useful to the public. The aggregate result is that figures of people can now be faintly discerned some little distance away, though their visibility is often impaired by the dazzle from carelessly used torches. In crucial cases vision is affected most readily by an oblique glance, the central region of the retina being in general out of action in the dark-adapted eye. One still finds marked differences in the experiences of observers. Some, even after the experience of the past few months, profess to be completely baffled by the darkness, others declare that they never need a torch, in fact do not possess one! According to the specification (see pp. 4-5) the illumination should not materially exceed 0.0002 ft.c., which is generally regarded as equivalent to starlight. The writer's impression is, however, that it is considerably less than the value of starlight on a clear frosty night and with an unobstructed sky. On a fairly wide suburban road, with low houses on either side, there is rarely any difficulty in seeing one's way or detecting approaching people—in fact the persistent luminosity of the sky, even at periods most remote from full moon (and even, in some cases, an overcast sky), seems to need some explanation. In such times as these one comes to recognise the influence of the "daylight factor." In the case of a narrow side street in the City of London, with high buildings on each side, the contribution of skylight may be minute as compared with open areas. As little aid is usually to be derived from headlights or traffic lights in such streets it is here that the torch is apt to prove indispensable.

Phosphorescence and Fluorescence

The eagerly awaited specification on Fluorescent and Phosphorescent Paint (see p. 10) should prove instructive in drawing attention to the widely different qualities and uses of different types of luminescent material. Fluorescent decorative effects achieved by the aid of "black" u.v. lamps have become familiar in cinema anterooms and elsewhere. How far they can be advantageously used on a big scale in the streets is more debatable, though it is reported that the organic products of the I.G. Farbenindustries are now being widely used in Berlin. The possibilities of phosphorescence also need much more exploration. Some of the luminous flowers and the like now on sale decay in brightness too rapidly after exposure has ceased to be of much effective use. It is said that more carefully prepared and irradiated materials may retain a useful brightness for as much as ten hours. The most spectacular claim brought to our notice is that the coating of phosphorescent material applied to the underground chambers of the Siegfried line will retain sufficient brightness to enable a newspaper to be read for five days after exposure! No doubt this will be verified (or otherwise) in course of time.

Photometric Reminiscences

Members of the Illuminating Engineering Society have an entertaining evening in prospect on February 13, when an informal meeting devoted to "Photometric Reminiscences" is to be held. This is an occasion when the comparatively aged are at some advantage and contributions are expected from a number of those whose recollections go back to the very early days of illuminating engineering. There will, however, be ample opportunity for others to relate instructive or entertaining experiences. A lantern and operator will be available. Members are also invited to bring with them interesting examples of early photometric instruments or apparatus. The meeting will take place at St. Ermin's Hotel, Westminster, at 6 p.m. Light refreshments will be served at the commencement of the meeting. Further refreshment may be ordered by members during the proceedings.

H.M. Chief Inspector of Factories: New Appointment

We note that Sir Duncan Wilson, whose last years of service as Chief Inspector of Factories have been marked by the passing of the new Factory Act and the inclusion therein of definite requirements of adequate and suitable lighting in factories, retires this month. Mr. A. W. Garrett, Deputy Chief Inspector, has been appointed as his successor.

Discomfort Glare in Lighted Streets

Mr. R. G. Hopkinson's paper on the above subject was given to an appreciative audience at the I.E.S. meeting on January 9. It was encouraging, in these times, to find such a good audience for a somewhat technical subject. An excellent discussion, in which about fifteen members took part, was opened by Dr. W. S. Stiles. The paper, which is the result of long continued research, was naturally prepared with reference to normal street lighting. It has, however, an evident bearing on present conditions when one's sensitiveness to glare is accentuated by the general obscurity. Pre-war studies of glare were mainly concerned with disability "glare," which impairs ability to distinguish objects. Mr. Hopkinson confines himself to "discomfort glare" —attacked by an ingenious method which avoids the fundamental difficulty that one cannot evaluate sensations numerically. The effect of various factors, such as general brightness of the scene, angle between direction of the glare source and the line of sight, number of glare sources, etc., was studied in great detail. Two interesting and definite conclusions were announced: (1) that the effect of a number of glare sources is additive, and (2) that there are no apparent differences in effect due to colour of the source. For the rest one might condense the conclusions broadly by repeating, what is now generally admitted, that glare is essentially a matter of contrast. This affords support for the school of thought which justifies some glare at angles somewhat below the horizontal by the mitigating effect of the resulting improved brightness of the roadway. (We say "mitigating effect" because, whilst effects of glare are in this way reduced, we do not think that they can be completely counteracted!) It may be said in conclusion that it is still a debatable point whether the division into "disability glare" and "discomfort glare" are two distinct phenomena, corresponding to different retinal effects and following different laws. Mr. Hopkinson certainly seems to produce experimental evidence in this direction, but a complete elucidation of the problem would, as Dr. W. D. Wright suggested in the course of the discussion, entail a tracking down of the various physiological processes involved.

Light Locks and Arcades

The idea of the light lock, treated in the specification BS/ARP 15 is now familiar. Many effective examples may now be seen. Experience has shown that it is often unnecessary to provide the light lock in its complete form (involving double reflection from black surfaces of all light entering it) provided that lamps near the inside entrance are suitably screened. The relaxation of the conditions in regard to signs and illumination in shop-windows also makes it possible to do something to embellish the outside of the lock with descriptive signs or notices. Moreover, although the original specification prescribes dead black interior walls with subdued lighting, there seems no reason why parts of them should not be decoratively treated, provided that users take precautions to avoid any appreciable escape of light into the street. On a small scale not a few stores have adopted what is equivalent to an "arcade-lock," which enables full lighting to be applied to a series of windows. A much more ambitious project—estimated to cost £50,000—is that for making the north side of Oxford-street a covered arcade, so that there would be, in effect, a continuous light lock stretching from the Marble Arch to Tottenham Court-road. The idea is said to be awaiting approval by the Home Office.

Dr. N. A. Halbertsma Lectures on Illuminating Engineering

Our illustration shows the Dean (or "Rector Magnificus") of Utrecht University shaking hands with Dr. N. A. Halbertsma after his first lecture as Professor of Illuminating Engineering, on November 20. We hope shortly to give a summary of the lecture. Dr. N. A. Halbertsma, besides being one of the foremost Continental experts on illumination, is of course an old and valued member of the Illuminating Engineering Society, with whom many members were delighted to renew acquaintance during the I.C.I. Conference in Holland in June last.

Illuminating Engineering in Australia

The annual report of the Council of the Illuminating Engineering Society of Australia (New South Wales), just received, covers the past session, terminating on September 30, 1939, so that only a brief period under war conditions is included. The membership of the Society has increased to 157 (including seventeen sustaining members). A varied series of papers were presented and published in the "Australian Engineer." Progress has been made towards realising the proposals jointly subscribed to by the societies in New South Wales and Victoria involving the formation of a Federal Council—with which is linked the efforts now being made to establish the society also in South Australia and Queensland. As a result of conferences in Sydney constitutional alterations are proposed, one result of which will be the introduction of a new and higher grade of membership, with technical qualifications, to be known as "Fellow." Practice in this respect will thus be in line with the proposals recently approved by the members of our own society in London.

Street Lighting Under War Conditions (BS/ARP 37)*

In what follows we give a summary of the above Specification, forming one of a series prepared by a Joint Committee of the Illuminating Engineering Society and the Ministry of Home Security (A.R.P. Dept.), and issued by the British Standards Institution at the request of the department mentioned above. The Specification is based on the provision of fittings, to which the certification mark of the British Standards Institution is to be attached, and which are required to comply (within limits) with certain prescribed polar curves of light distribution, corresponding with standard mounting heights. The effect is to make sure, *firstly*, that the limiting illumination of 0·0002 ft.c. is not not materially exceeded, and, *secondly*, that the distribution of light is reasonably uniform.

Value of Illumination.

The illumination prescribed in this specification (0.0002 ft.c. on a horizontal surface at road level), for use in streets under the special requirements imposed by wartime conditions, is minute in comparison with that afforded by normal street lighting—being of the same order as that afforded by bright starlight on a clear moonless night. It will, however, provide some comfort and convenience to users of the streets.

Fittings intended to furnish this illumination should be mounted on columns selected from those existing in the streets. Complete uniformity cannot be achieved, but in practice the general level of illumination will approach closely to this value of 0.0002 ft.c., and will nowhere exceed 0.0004 ft.c., provided that the light distributions are such as to come within the limits specified.

Light Distribution.

In order to ensure compliance with this condition the specification presents three sets of polar curves of light distribution, corresponding to mounting heights of 10, 15 and 20 ft. These diagrams are reproduced in Figs. 1, 2, and 3. In each case the polar curve of the candlepower distribution of the lighting fitting shall, in all vertical planes, lie wholly out inside the limiting curve marked " A."

In general the specification contemplates that the polar curve of light distribution shall also lie outside the inner curve " B," and a typical intermediate curve, marked " C," is shown in each figure.

A concession is, however, made to the fact that in some cases fittings in some degree asymmetric may be employed by the following additional paragraph:—

" Within 45 deg. in a horizontal plane, on either side of the direction of the street axis, the curve shall lie outside the corresponding limiting curve ' B.' Elsewhere the maximum candlepower shall not be less than one-half of the maximum candlepower of curve ' B '."

Mounting Height and Spacing.

The light distributions prescribed are associated with nominal mounting heights of 10, 15, and 20 ft. respectively. Fittings having these distributions may be mounted at heights as shown below, provided that the spacing of lighting fittings, measured along a line joining them in plan, is not less than 100 ft.:—

Range of mounting heights for which the fitting may be used.	Nominal mounting height.
9 ft. — 14 ft.	10 ft.
14 ft. — 19 ft.	15 ft.
19 ft. and upwards.	20 ft.

Where columns are spaced at less than 100 ft. but at distances greater than 75 ft., and where it is inconvenient to use every second or third column, the fittings may be mounted at heights as shown below:—

Actual mounting height.	Fittings adopted to be suitable for nominal mounting height of:—
14 ft. — 19 ft.	10 ft.
19 ft. and upwards.	15 ft.

To provide for spacings less than 100 ft. where the actual mounting height is less than 14 ft., an additional standard distribution curve is in preparation.

Mounting and Erection.

Lighting fittings shall be fixed vertically and with sufficient rigidity to prevent emission of light above the horizontal and to prevent rotation; and, if necessary, correctly oriented. Parts of columns close to light sources shall not be unduly bright. When units are closely adjacent to light-coloured vertical surfaces or expanses of water, blackened side-screens (which shall themselves not reflect appreciable light above the horizontal) shall be provided to prevent direct falling upon them. Where fittings are attached to existing lanterns interference with the light distribution and particularly reflection of light in an upward direction by glass panels, etc., must be prevented.

In regard to construction it is prescribed that parts which control the optical properties of the fitting shall not be liable to variation of derangement; and that the materials and construction shall be robust and not liable to such deterioration as may bring the photometric performance outside the prescribed limits.

Construction of the Limiting Curves in Figs. 1, 2, and 3.

The limiting curves A and B in Figs. 1, 2, and 3 are constructed by joining, as shown in the figures, the points the polar co-ordinates of which are given in Tables 1, 2, and 3 below.

TABLE 1. Curves for Nominal 10 ft. Mounting Height (Fig. 1).

Angle	Curve A	Curve B
0°	0·04	0·02
60°	0·30	0·15
65°	0·60	0·30
80°	0·60	0·30
85°	0·30	0·00
90°	0·00	0·00

TABLE 2. Curves for Nominal 15 ft. Mounting Height (Fig. 2).

Angle	Curve A	Curve B
0°	0·090	0·045
45°	0·26	0·13
70°	0·90	0·45
80°	0·90	0·45
85°	0·50	0·00
90°	0·00	0·00

TABLE 3. Curves for Nominal 20 ft. Mounting Height (Fig. 3).

Angle	Curve A	Curve B
0°	0·16	0·08
60°	0·42	0·20
70°	1·00	—
71°	—	0·50
73°	1·50	—
80°	1·50	0·50
85°	0·75	0·00
90°	0·00	0·00

Photometric Testing.

Under this heading it is stated that the candlepower distribution is to be determined with a photometer, the receiving

*Published by the British Standards Institution, 28, Victoria Street, London, S.W.1. Price 6d., Post Free 8d.

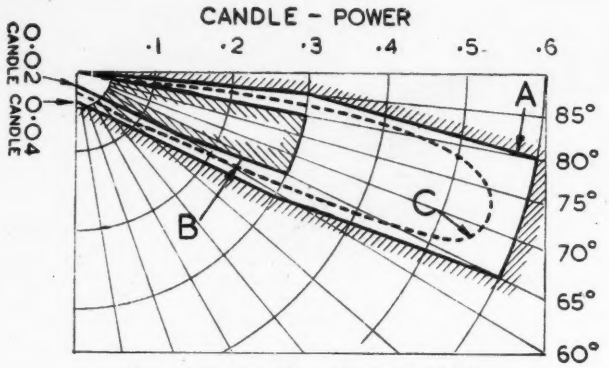

Fig. 1. Nominal 10 ft. Mounting Height.

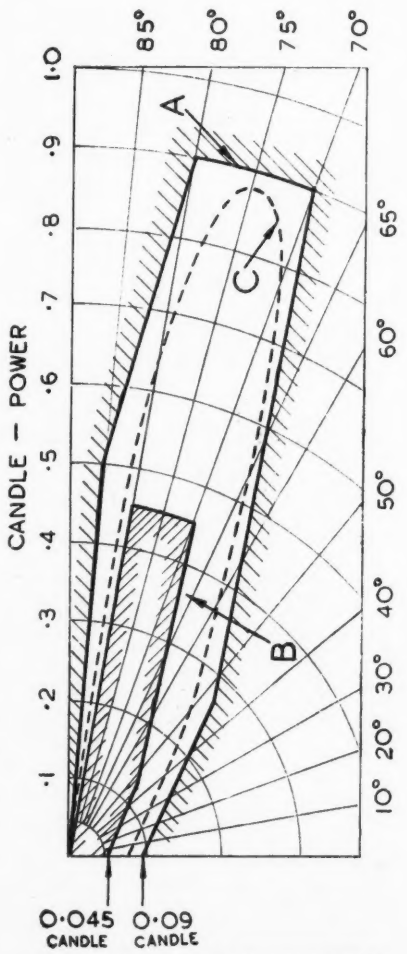

Fig. 2. Nominal 15 ft. Mounting Height.

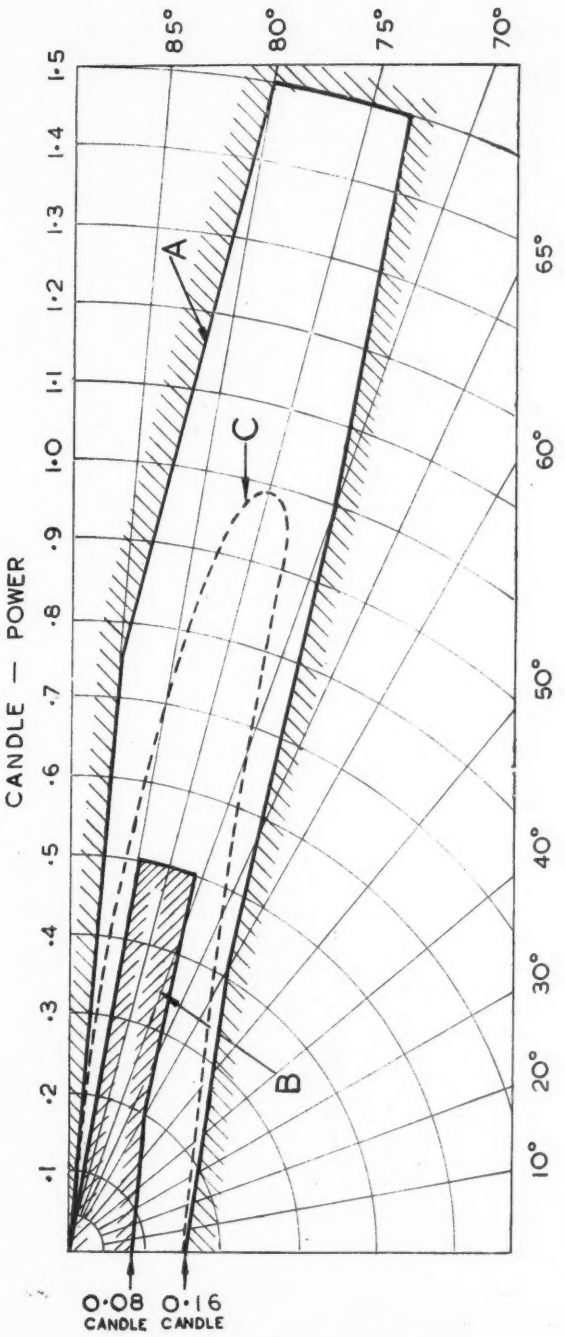

Fig. 3. Nominal 20 ft. Mounting Height.

surface of which is not less than 2 ft. from the light-source. The fitting is to be assembled in accordance with the instructions of the manufacturer, who is to be given the opportunity of attending in order to ensure that it is properly assembled and operated

All gas conversion fittings, or electrical conversion fittings which employ any parts of existing lanterns, shall be tested complete with a typical lantern for which the conversion is designed.

Marking.

Lighting fittings complying with clauses 3 and 6 (relating to Light Distribution and Construction) of the specification shall bear the certification mark of the British Standards Institution. They shall also be marked with the appropriate nominal mounting height and size of lamp or mantle and, if necessary, with an indication of the correct orientation with respect to the direction of the street. (Particulars of conditions under which licences for the use of the Institution's registered certification mark may be granted to manufacturers of lighting fittings may be obtained on application to the Director, British Standards Institution.)

Literature on Lighting

(Abstracts of Recent Articles on Illumination and Photometry in the Technical Press)

II.—PHOTOMETRY.

1. A Direct-reading Photo-electric Densitometer.

D. R. White. J. Soc. Mot. Pict. Eng., Vol. 33, p. 403, October, 1939.

Describes a direct-reading photo-electric densitometer designed to give high accuracy with the highest possible speed of reading. The rotation of a circular neutral wedge in the optical bath of the exciter lamp and photo-cell produces a periodic variation in the light reaching the photo-cell. By providing a means of flashing a stroboscopic lamp each time the illumination on the cell reaches some arbitrary value, the position of the neutral wedge, and hence the density of the specimen, can be determined by direct observation of a scale attached to the wedge. R. G. H.

2. A Mechanical Integrator for the Determination of Illumination from Diffuse Surface Sources.

V. H. Cherry, D. D. Davis, L. M. K. Boelter. Am. Illum. Eng. Soc. Trans., 9, pp. 1085-1094, November, 1939.

The integrator described measures a "shape factor" by means of which the illumination from diffuse sources can be calculated. A model of the source is necessary. J. S. S.

III.—SOURCES OF LIGHT.

3. The Smallest and the Largest Lamps.

Anon. Magazine of Light, VIII., p. 33, November, 1939.

The photographs, with particulars, are given of the largest and smallest lamps made. The latter consumes 0.17 watt and produces 0.35 lumen, while the former consumes 50,000 watts and produces 1,600,000 lumens. C. A. M.

4. Carbons for Transparency Process Projection in Motion Picture Studios.

D. B. Joy, W. W. Lozier, and M. R. Null. J. Soc. Mot. Pict. Eng., Vol. 33, p. 353, October, 1939.

Discusses carbons suitable for the different optical systems used in back projection work. Data on the amount and distribution of light which can be obtained on the transparent screen are given. Characteristics of recently developed carbons are given. R. G. H.

5. Recent Improvements in Carbons for Motion Picture Studio Arc Lighting.

D. B. Joy, W. W. Lozier, and R. J. Zavesky. J. Soc. Mot. Pict. Eng., Vol. 33, p. 374, October, 1939.

New carbons have been designed for "broadside" lamps giving quieter burning and steadier light curves of spectral energy distribution of light received on the set, and records illustrating the improved steadiness and quieter burning are shown. R. G. H.

6. Electrical Characteristics of Low Pressure Discharge Lamps.

J. W. Marden, G. Meister. Am. Illum. Eng. Soc. Trans. 9, pp. 1095-1107, November, 1939.

Data presented show the effect of electrode design, tube length and diameter, the nature of the gas and its pressure upon the electrical characteristics of low pressure discharge lamps. J. S. S.

7. New Starting Device for Fluorescents.

Anon. El. World, 112, p. 1630, December 2, 1939.

A special starting device for use with the tubular fluorescent discharge lamps is described. Use is made of the bi-metallic thermostat principle, and one advantage claimed is that, unlike the ordinary thermal relays, it will operate immediately after the lamp is extinguished, e.g., by an interruption in the circuit, without waiting for the unit to cool. S. S. B.

8. Fluorescent Lamps.

L. S. Ickis, Karl Staley. Magazine of Light, VIII., No. 7, pp. 14-15, and pp. 23-27, November, 1937.

Numerous instances with photographs are given of the uses to which fluorescent lamps have been successfully placed. These include lighting installations in stores, with particular reference to the display of silverware, and also medical centres. C. A. M.

IV.—LIGHTING EQUIPMENT.

9. A.R.P. Lighting.

Anon. Elect., 123, p. 463, November 24, 1939.

Details are given of new lighting equipment now available for works and shelters. C. A. M.

10. New Equipment and Appliances.

Anon. Elect., 123, p. 511, December 8, 1939.

A description with a photograph is given of a new form of lighting fitting intended for use in gangways between storage racks, etc. C. A. M.

11. A.R.P. Signs.

Anon. Elect., 123, p. 502, December 8, 1939.

Examples of A.R.P. signs now available for road and shelter indication are described with photographs. C. A. M.

12. A.R.P. Equipment.

Anon. El. Rev., Vol. CXXV., No. 3,234, p. 652, November 17, 1939.

Describes, with photographs, a telescopic lamp shield, the amount and distribution of light from which can be regulated, and also a chest lamp complying with BS/ARP 3, using jelly-acid or alkaline batteries. R. G. H.

13. Shop Window Lighting.

Anon. El. Rev., Vol. CXXV., No. 3,237, p. 731, December 8, 1939.

Details are given, and illustrated by diagrams, of fittings complying with the new regulations for displays and signs in shop windows. R. G. H.

14. New Electrical Products.

Anon. El. Rev., Vol. CXXV., No. 3,237, p. 735. December 8, 1939.

Describes, and illustrates with photographs, new apparatus, including black-out torches, a new pin-up wall bracket, and moulded plastic shades. R. G. H.

15. Shop Window Lighting.

Anon. Elect., 123, p. 501, Dec. 8, 1939.

Details with diagrams are given of a display cabinet designed to give reduced illumination values in shop windows under war-time conditions. C. A. M.

16. Fluorescent and Phosphorescent Paint.

British Standard Specification BS/ARP 18.

Deals with phosphorescent and fluorescent paint for A.R.P. purposes. The different varieties are defined and tests and markings are specified. In an appendix the uses of such paint are discussed in detail. The chief sources of ultra violet radiation are mentioned, and examples of the brightness of fluorescence attainable are given. J. S. D.

V.—APPLICATIONS OF LIGHT.

17. Progress in the Production and Application of Light.

A. L. Powell. Elect. Engineering, 58, p. 497, December, 1939.

A very comprehensive review is made of developments in lamps and lighting during the past three years. These include new incandescent and electric discharge lamps, carbon arcs for special purposes, lighting instruments, applications of lighting to various fields, polarised light, lighting standards, and the meeting of the International Commission on Illumination. S. S. B.

18. Light and Architecture.

Anon. Am. Illum. Eng. Soc. Trans., 9, pp. 987-991, November, 1939.

Some representative architectural lighting schemes are described with photographs. J. S. S.

19. Planned Lighting for "Seeing."

H. Long. El. Rev., Vol. CXXV., No. 3,233, p. 609, November 10, 1939.

The fundamentals of vision are not sufficiently well known among designers of installations of lighting equipment. The problems of glare, visual Acuity, brightness, perception, etc., must all be borne in mind when specifying methods of illumination. R. G. H.

20. Street Lighting under War-time Conditions.

British Standard Specification BS/ARP 37.

The conditions requisite to furnish a general level of illumination at road surface of 0.0002 ft.c. are defined. Diagrams showing the limits of light distribution for fittings mounted at heights of 10, 15, and 20 ft. are presented. Special measures for use when the spacing is less than 100 ft. are indicated. Sections are devoted to mounting and erection, construction, photometric testing and marking. Approved fittings are to bear the certification mark of the B.S.I. J. S. D.

21. Street Lighting.

Anon. El. Rev., Vol. CXXV., No. 3,240, p. 819. December 29, 1939.

Describes and illustrates new fittings that are now available, which comply with BS/ARP 37. Particulars of new photometres and limit gauges are also given, these being designed to give readings in some cases down to 0.0001 ft.c. R. G. H.

22. Combination Mercury Vapour and Incandescent Street Lighting.

Ralph W. Coursey. El. World, 112, p. 1290. November 4, 1939.

A description is given of the system adopted in an American city for the lighting of the Civic Centre. This area is lighted by units combining high-pressure mercury vapour and incandescent filament lamps. Full details of the scheme are given. In particular the control system presents some novel features. S. S. B.

23. War-time Street Lighting.

D. G. Sandeman. El. Rev., Vol. CXXV., No. 3235, p. 674, November 24, 1939.

The author develops an idea for street lighting by means of luminous pylons, and applies it to war-time black-out conditions. (See El. Rev., July 21, 1939.) R. G. H.

24. A.R.P. Street Lighting.

Anon. Elect., 123, p. 564, December 29, 1939.

Details, with photographs, are given of two low intensity street lighting fittings designed for A.R.P. street lighting. C. A. M.

25. Traffic Safety Lighting.

Sub-committee on Street and Highway Lighting. Am. Illum. Eng. Soc. Trans., 9, pp. 1025-1072, November, 1939.

This paper summarises the codes and recommendations so far issued by the American I.E.S. The need for better visibility and the fundaments of street lighting are discussed, and equipment for urban and inter-urban lighting is described. J. S. S.

26. Silhouette Seeing with Motor-car Headlamps.

Val Roper, K. D. Scott. Am. Illum. Eng. Soc. Trans., 9, pp. 1073-1084. November, 1939.

Data obtained under actual driving conditions show that when meeting another car the visibility distance is increased by silhouette vision against the illumination due to the car's oncoming headlights. The data gives the best angle at which to depress the beams. J. S. S.

27. A Survey and Analysis of the Present Lighting Condition in Homes.

E. W. Commery. Am. Illum. Eng. Soc. Trans., 9, pp. 1003-1025, November, 1939.

This paper gives a detailed analysis of the domestic lighting equipment at present in use in America. J. S. S.

28. Industrial Efficiency.

"Works Engineer." Elect., 123, p. 486, December 1, 1939.

The general principles of satisfactory interior lighting for industrial requirements are discussed. C. A. M.

29. Industrial Lighting.

E. G. Lund. Magazine of Light, VIII., pp. 16-17, November, 1939.

Details, with photographs, are given of four industrial lighting installations. In one, combined mercury and tungsten lamps give values of 80 ft.c. C. A. M.

30. Artificial Daylight for Colour Grading.

Anon. El. World, 112, p. 1324. November 4, 1939.

Details are given of the installation adopted by the American Department of Agriculture for the provision of artificial daylight for the grading of farm products, and particularly cotton. The system is being generally adopted for colour discrimination requirements. Filament lamps are used with special glass filters, and a high intensity is provided. S. S. B.

31. Hospital Installation.

R. F. Twentyman. El. Rev., Vol. CXXV., No. 3234, p. 635, November 17, 1939.

Describes, and illustrates with photographs, many of the new lighting installations at the Westminster Hospital's new buildings. R. G. H.

32. Fluorescent Shop Lighting.

J. B. Harris. El. Rev., Vol. CXXV. No. 3236, p. 706. December 1, 1939.

The advantages of shop lighting by fluorescence for war emergency conditions are described, and some details of technique are given. R. G. H.

33. Food Stores.

Anon. Magazine of Light, VIII., p. 29, November, 1939.

Details, with photographs, are given of lighting installations in two food stores. C. A. M.

34. Studebaker's New York Showrooms.

Anon. Magazine of Light, VIII., p. 28. November, 1939.

Silvered mirror reflectors are used effectively in a motor-car showroom. Values of 100 ft.c. are obtained in the window and 50 ft.c. in the main store. C. A. M.

35. (a) Erith's New Showrooms; (b) Hornsey's New Showrooms.

Anon. El. Rev., Vol. CXXV., (a) No. 3,233, p. 610, and (b) No. 3,240, p. 818.

Describes and illustrates with photographs the new showrooms at Erith, and at Hornsey. Some novel lighting effects have been installed. At Hornsey the use of fluorescent shop window displays is being illustrated and advocated R. G. H.

36. Tennis Court Lighting.

Anon. Elect., 123, p. 519, December 15, 1939.

A description with a photograph is given of an installation of lighting equipment for an indoor tennis court in Paris. The units employed are of an unusual design, each consisting of metal reflector painted matt white with two mirrors and an auxiliary reflector. 750 watt and 1,000 watt lamps are used, and a high coefficient of uniformity of lighting is obtained. C. A. M

Recent Patents

(Abstracts of recent Patents on Illumination & Photometry.)

No. 512,154. "Improvements in Luminescent Materials."

The General Electric Company, Ltd. (communicated by Patent-Treuhand-Gesellschaft für Elektrische Glühlampen m.b.H.). Dated March 11, 1938; *November* 25, 1938; *December* 16, 1938 (*cognate applications*).

This specification describes a group of luminescent materials which are less sensitive than prior materials to impurities. The luminescent materials consist of phosphates and borates of Li, Na, K, Rb, Cs, Be, Mg, Zn, Cd, Ca, Sr, B, Al, and La, which act as matrices. A sufficient quantity of the phosphates and borates of silver, thallium, tin, lead, cerium or antimony are added as an activator in a proportion in excess of 3 per cent. and up to 30 per cent.

No. 512,693. "Improvements in Electric Incandescent Lamps for Use in Mines."

Concordia Elektrizitäts Aktiengesellschaft. Dated April 21, 1937. (*Convention, Germany.*)

This specification covers incandescent lamps for use in miners' lamps in which the leading in wires or electrodes projecting from the glass pinch and supporting a helical filament are so short in length that they cannot touch one another however far they may be bent. Thus the risk of a short circuit, if the lamp bulb be broken, is avoided.

No. 512,791. "Improvements in or Relating to Gas-filled Incandescent Electric Lamps."

Société Anonyme Pour Les Applications De L'Electricité Et Des Gaz Rares Etablissements Claude-Paz and Silva. Dated January 27, 1938. (*Convention, Switzerland.*)

This specification relates to gas-filled lamps such that the volume may be small in relation to the power. The glass envelope enclosing the gas-filled space terminates at each of its two opposite ends in a pinch located on the outer surface of the envelope and bearing a lighting filament. Both filaments are connected in series by a conductor situated outside the envelope and the envelope encloses no glass parts. The lamp and conductors connecting the filaments in series may be enclosed in a sealed glass jacket. The envelope may contain more than 50 per cent. xenon and may have a volume in cubic centimetres between the fourth root of and the square root of the voltage of the lamp.

No. 512,885. "Improvements in and Relating to Gas or Vapour-Filled Electric Discharge Tubes."

Neimanis, K. Dated February 18, 1938.

This specification describes a gas or vapour-filled discharge lamp surrounded by a vacuum jacket for the purpose of heat insulation. The jacket comprises a cathode glow discharge device, electrodes being provided therein. The discharge device remains inoperative as long as the vacuum in the jacket is high, but it passes a discharge current when gas is liberated into the jacket, thus cleaning up the free gas and restoring the vacuum.

No. 512,913. "A New or Improved Convertible Light Reflector or Shade."

Skinner, G. D., Iliffe, A. E., and The Benjamin Electric Ltd. Dated March 21, 1938.

This specification describes a pendant lighting fitting comprising a main reflector and a supplementary disc reflector operating in conjunction as a single reflector to afford maximum general dispersive lighting. The supplementary reflector, in normal use, forms a continuation of or part of the main reflecting surface. It is, however, mounted upon an opaque telescopic concentrating reflector consisting of a number of sleeves which, when in use, surround the light source. The lowest of the sleeve elements is connected to the supplementary reflector disc so that the supplementary disc may be drawn down, extending the telescopic concentrating reflector so that both the main and the supplementary disc reflectors are rendered inoperative and the telescopic concentrating reflector concentrates the light over a small area.

No. 512,955. "Improvements in and Relating to Vehicle Head Lamps."

The British Thomson-Houston Company, Ltd. Dated March 23, 1937. (*Convention, U.S.A.*)

With the object of producing a penetrating, long, narrow pencil of light as well as a uniform and symmetrical distribution of light across the entire width of the roadway to reveal curves therein and objects at the sides, the front lens of a vehicle head light, according to this specification, comprises horizontally disposed top and bottom sections extending entirely across the lens. Each of the sections has vertically extending elements of narrow light spread. The lens also has upper and lower horizontally disposed intermediate sections having vertically extending elements of wide light spread. The central section of the lens has vertically extending elements adjacent the vertical centre line of the lens having wide light spread and other vertically extending elements at each side having a narrow light spread. The degree of spread of the vertically extending elements included within each section decreases from the vertical centre line of the lens outward.

No. 512,956. "Improvements in and Relating to Vehicle Head Lamps."

The British Thomson-Houston Company, Ltd. Dated March 23, 1937. (*Convention, U.S.A.*)

This specification has for its object the provision of a head lamp for city driving producing a beam entirely below the horizontal and in which the high intensity portion is spread out and graded off at each side. To this end the front lens comprises top, bottom, and centre sections all extending horizontally across the full width of the lens. Each section is provided with vertically extending elements having different degrees of light spread. In use the lamp is tilted slightly downwards.

Modern Factory Lighting

The above picture illustrates the appearance of a section of the new "Drys" building recently completed by Messrs. Boots Pure Drug Company, Ltd. In the area shown—the packeting hall—195 Benjamin Saaflux R.L.M. reflectors, equipped with 200-watt lamps, are installed. The lighting is exceptionally well distributed; 5-16 ft.c., according to the class of work, is provided throughout the building, in which altogether over 3,000 reflectors have been used.

Ultra-Violet Shop-Window Display

In view of the limited amount of light permitted for shop-window lighting, the possibilities of fluorescent effects well deserve study. A case has been brought to our attention by Mr. Fraser Gordon—a display arranged by Messrs. Ernest Marks Publicity, Ltd., in Mancnester. The irradiation was effected by Crompton "black" lamps. In the display, window stands, supports, and glass-shelf edges were treated with luminescent paint and likewise the goods themselves. There was on view, for example, a pair of multi-coloured ladies' evening shoes, picked out in their daylight colours. Other shoes were treated in various ways in the three shops of the Dolcis Shoe Company in Market-street, and there was a display of fluorescent stockings in the adjacent Dolores stocking shop. In each case the transition from daylight to the fluorescent night effect was most effective in attracting the attention of passers-by. We gather that the brightness was not sufficient to allow of a photometric reading by the instrument available and there was practically no spill through the window.

The use of fluorescent effects as a device to attract attention is, of course, becoming familiar, but it is believed that the display by this means of goods actually sold is a new departure.

Church Lighting

A catalogue on church lighting, recently issued by Holophane, Ltd., reminds us that there is much to be done in this field, even if the present black-out limits immediate possibilities. The leading picture is an imposing view of the procession leaving the Abbey after the Coronation ceremony in May, 1937. Other illustrations, which include cathedrals, parish churches, and Nonconformist places of worship, show interesting methods of lighting, some with sources completely concealed from view, others with panels built into the ceiling, and others again using more conventional pendant fittings. It is part of the irony of fate that this list, on which so much care had evidently been expended, appears in war time. Nevertheless Holophane, Ltd., now appear to be receiving increasing inquiries for church lighting!

Fluorescent and Phosphorescent Paint

British Standard Specification, BS/ARP 18, prepared under the ægis of a Joint Committee of the Illuminating Engineering Society and the Air Raid Precautions Department of the Ministry of Home Security.

The issue of this specification has been awaited with considerable interest. At the outset a distinction is drawn between materials which are "fluorescent" (i.e., emit a useful amount of light only while they are being irradiated) and "phosphorescent" (i.e., continue to emit light after the source of irradiation has been removed).

Types of Phosphorescent Material.

Phosphorescent materials, however, may be in turn separated in two groups.

Type A have a high brightness during excitation with "black" (u.v.) lamps and continue to show high brightness for a few minutes after excitation.

Type B show a lower initial brightness, but the duration of the "afterglow" is longer than in the case of Type A materials.

It is evident that the choice between these two types of phosphorescent material will depend greatly on the use to which the material is put.

The specification contains clauses requiring that the medium will mix with the powder so as to ensure the right proportions being maintained, and that both should be suitably packed so as to retain their properties for at least six months (the packing date being shown on the label).

Tests of Performance.

Tests for fluorescent and phosphorescent materials are prescribed with the aid of appendices. In both cases tests are to be made at room temperatures (15°-25° C.). When irradiated by the standard source in the prescribed manner the brightness of fluorescent material is not to be less than 0.1 equivalent foot-candle.

In the case of phosphorescent materials, Type A, the limiting (maximum) brightness prescribed is also to be not less than 0.1 e.ft.-c., and during the period after irradiation has ceased the brightness is not to fall below 0.001 e. ft.-c. at the end of a period to be specified by the manufacturer.

In the case of phosphorescent Type B materials, the brightness, one minute after the extinguishing of the source of irradiation, is to be not less than 0.005 e. ft.-c.; during the ensuing period, with a time limit to be stated by the manufacturer, it shall not fall below 0.001 e. ft.-c.; and during a further period (with the time limit also specified by the manufacturer) it shall not fall below 0.0001 e. ft.-c. (These tests serve as an indication of the rate of decay of the phosphorescence—they do not necessarily represent useful values for all the applications for which the specification is designed.)

In regard to life the manufacturer is also required to state whether the material is intended to be suitable (a) for use out of doors, (b) for use indoors exposed to ordinary daylight and sunlight or high intensities of u.v. radiation, or (c) for use indoors, but not exposed for long periods to daylight and sunlight or high intensities of u.v. radiation.

Other directions relate to marking. Mention is to be made of BS/ARP 18, of manufacturer's or supplier's name, and of whether fluorescent or phosphorescent material, and paint or powder and medium is enclosed in the package. Instructions for use, covering power, and date of packing should also be given.

Conditions for Photometric Tests.

In Appendices A and B particulars of the proposed standard source of ultra violet energy and of the method of testing brightness are set out. The standard source is a tungsten filament lamp operating at 3,000° K., furnishing 1,200 candles. A 230 V. 500 w. Class A.1 projector lamp also complies closely with this specification, due allowance for actual c.p. being made. The luminescent surface is placed 3 ft. from the filament of the standard lamp and light is allowed to pass through a Wratten 18A u.v. filter before irradiating the surface. (The possibility of using a calibrated mercury vapour "black" lamp is also under consideration.)

The method of photometric testing is indicated by the aid of a diagram and involves the use of a visual brightness photometer suitable for the range of brightness referred to in the specification. Where necessary advice may be sought from The National Physical Laboratory.

(The difficulty of measuring brightness as low as 0.0001 e. ft.-c. is recognised, and a simpler form of test is under consideration.)

In a further appendix to the specification luminescent materials are divided into (a) zinc and zinc-cadmium sulphides and the like, (b) alkaline—earth sulphides, and (c) certain organic derivatives. (A fourth class, comprising such materials with the addition of radio-active material, which emit light over long periods but are relatively expensive, is not here considered.)

Conditions of Irradiation and Use.

Such materials may be either fluorescent or phosphorescent, as previously defined. The action of the latter depends upon whether the material is irradiated (i) continuously by sources of radiation, (ii) by visible or u.v. sources so that the phosphorescent properties may be utilised when the source is extinguished, or (iii) by daylight so as to use the phosphorescence after dark. In addition to paints, which form the subject of this specification, luminescent materials can now be obtained in the form of dyes, chalks, and transparent gelatines, etc. For A.R.P. purposes, however, luminescent powders incorporated in paints, vitreous enamels, and synthetic resins (moulded in special shapes such as switch covers, etc.) are of chief importance

The brightness depends materially on the composition and thickness of the applied film. A diagram relating brightness to weight of powder is included in the appendix to the specification. From this it is evident that beyond a certain point no material advantage is gained from a further increase in the weight of powder per unit. With a white undercoat a resulting brightness 20% greater than that attainable with a black backing may be expected. With a view to durability only media recommended by the manufacturer as suitable should be used.

In approaching manufacturers users should state the nature of the excitation to which the paint will be exposed, the use to which it is to be put, and the duration of the period after extinction for which useful phosphorescence is required.

Apart from the use of mercury vapour lamps with "black" glass filters (cutting out almost all the visible light but transmitting u.v. radiation), which form the main types of sources commercially available, tungsten filament and argon-filled negative glow lamps, equipped with suitable filters, may be used. They are, however, less powerful, as is indicated by tables showing their comparative effect.

Brightness Attainable.

As a guide to brightness values the brightness attained by various fluorescent paints when exposed to a 125 watt black lamp 3 ft. away is mentioned. This varies from 3.5 e. ft.c. for yellow and green

down to 0.4 for blue. With yellow or green paint the brightness specified in the H.O. memorandum for standard road signs (0.1 c.p. per sq. in.) is attainable with a 125 watt "black" lamp at about 10 ft. distance. Another table shows the relative brightness attained with various sources (e.g., 4 for the 125 watt "black" lamps, as compared with 0.01 for the 5 watt negative glow lamp with "black" glass filter).

Applications.

In using u.v. "black" lamps care should be taken to screen the eyes from direct light so as to avoid the unpleasant glare effect due to fluorescence of the eyeball. Where sources cannot be readily shielded from prolonged direct view, discomfort may be avoided by using special eyeshades or spectacles.

The selection of the quality of phosphorescent or fluorescent material will naturally depend upon the purpose to which it is to be put and, in the case of phosphorescent paint, on the period for which an appreciable "after glow" is desired.

The two main advantages of such methods are that, with fluorescence, the rays from the "black" lamp can spill on to surfaces other than the luminescent materials, without the production of appreciable visible light, whilst phosphorescence provides a source of light requiring no power for its immediate operation provided it has been previously energised.

When neither of these two advantages is evident the job can usually be better done with visible light. Possible applications include the irradiation of electric or other forms of control equipment, instrument dials, name boards for railway stations or air raid shelter entrances, aids to movement in factories, direction signs (remaining visible in the event of failure of artificial light), etc.

Obituary

Sir Francis Goodenough

In the death of Sir Francis Goodenough there has passed away one of the leaders of the gas industry.

Throughout the whole of his career he was associated with the Gas Light and Coke Company, of which he became Controller of Gas Sales. For many years he was executive chairman of the British Commercial Gas Association. It was largely through his influence that the service side of the gas industry was developed and its social aspects were so assiduously cultivated. He also served on many Government committees and was identified with numerous social and charitable movements.

Sir Francis Goodenough was one of the original founder-members of the Illuminating Engineering Society, in which he took a keen interest, serving on the council and on committees and ultimately becoming President. He served on the National Illumination Committee and rendered valuable service in connection with the organisation of the International Illumination Conference in England in 1931.

There is no doubt that the idea of the impartial platform provided by the Illuminating Engineering Society made a strong appeal to his instinct for co-operation and social service. By his death the Society has lost a good friend, from whose sagacity it frequently benefited during his period of office.

Mr. H. W. Gregory

We record with regret the death of Mr. H. W. Gregory, who was associated with the Northmet Power Company and a member of the Illuminating Engineering Society of long standing. Mr. Gregory took a keen interest in street lighting. He served on the Street Lighting Committee of the British Standards Institution and was a member of Council of the Association of Public Lighting Engineers. He was also the representative of the Institution of Electrical Engineers on the National Illumination Committee, and attended the conference of the International Commission of Illumination in Holland last June. The news of his death has been received with general regret by those associated with the lighting industry, amongst whom he was widely known.

The blacking-out of offices, factories and shops does not necessarily mean the dimming of interior lights. That only leads to inefficiency and a fall in production. What it does mean, however, is that light must be concentrated. And this can be done with definite advantage, as Crompton experts, who have been assisting many big organizations with this question, have proved again and again. They have found that the revision of lighting systems frequently means better lighting for the employees to work by, and a saving in the amount of current used. Crompton will be glad to send their technicians to help you to surmount any of your lighting difficulties. They are extremely well equipped to do this as, ever since the outbreak of hostilities, they have been advising, assisting, adapting, for businesses, large and small, all over the country. As a result of new demands created by this situation, Crompton have never been busier than they are to-day. *Let them make light of your black-out problems.*

"Carry on" with

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REGISTERED TRADE MARK

CROMPTON PARKINSON, LTD., BUSH HOUSE, LONDON, W.C.2

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War Time Street Lighting

The New Lamps Now Available

As we go to press we receive particulars of the first of the new lamps to furnish "synthetic star light," in accordance with the British Standard Specification summarised on pp. 4 and 5 in the present issue. It will be noted that all such lamps, before installation in the streets, have to be approved and to receive the official B.S.I. mark. In the instances mentioned this has already been granted or is expected to be granted almost immediately. The Specification, it will be observed, provides for three different polar curves of light distribution corresponding to three mounting heights of the order of 10, 15 and 20 ft. A somewhat different design may, therefore, be necessary in the three cases. In most cases firms are concentrating first on the provision of units suitable for use at 20 ft. mounting heights, such as are used chiefly in main streets, but fittings for the other two ranges of height (and also for the specially close spacing mentioned in the specification) should be available very shortly.

The problem of securing the correct distribution of light combined with the requisite low candlepower is a most interesting one, and has been solved by several quite different and highly ingenious methods.

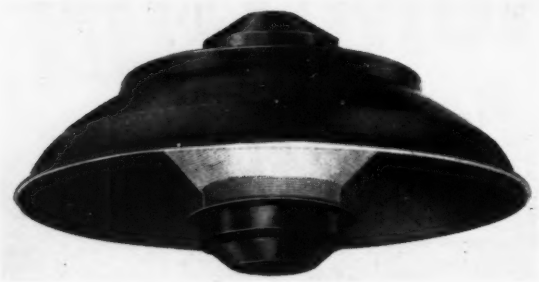

Fig. 1. Holophane 302 A.R.P. unit.

The 15-watt general service electric lamp, the smallest available, gives about 10 m.sph.c.p. and its light must be reduced to 1-10th at 75° and 1-60th at 0°. In the Holophane unit this is achieved by a metal lantern with a reducing cylinder giving the maximum c.p. over 65° to 85° to the vertical. The central cylinder has a metal cap at the bottom above which is an inverted cone, pierced by small apertures, which extends upwards to the overhead reflector. The lantern is of heavy gauge metal and is 10 in. in diameter. The combination of bowl-shaped reflector and conical and cylindrical light-baffle ensures a cut-off below the horizontal and provides a large area of low luminosity—distinctly advantageous from the visual standpoint. Various adaptations enable these fittings to be readily applied to existing street lanterns.

The unit introduced by the General Electric Company, Ltd. (see Fig. 2), uses two alternative optical designs adapted respective to 15-watt or 25-watt or 40-watt, or 60-watt lamps (the lamps of the lower power give sufficient light for the purpose, but the 40—60-watt lamps are somewhat more robust). The Z.3210 unit, for 15—25-watt lamps, is of spun steel, uses a flashed opal cylinder with sheet metal grid, and can be applied to all the three mounting heights. With the other design, constructed or lead-coated sheet steel incorporating a special G.E.C. lighting device, 40-watt lamps are used on 10-ft. posts, and 60-watt lamps for 15—20 ft. Stress is laid on the ease with which units can be applied to existing lanterns by connection through a short length of flexible cord.

Fig. 2. G.E.C. A.R.P. street-lighting unit (Z.3210).

The next illustration (Fig. 3) shows the new Sugg 0.0002 gas street lighting unit attached to a "Littleton" suspension lamp. The reduced light penetrates through slots in a metal cylinder. All such units employ 1 lt. No. 1 size mantle burners, rated at 875 B.Th.U. gas per hour, using 1¾ cub.ft. per hour of 500 B.Th.U. gas The reflector, the underside of which is finished with a special mat black paint, is hinged to give access to the mantle, and carries

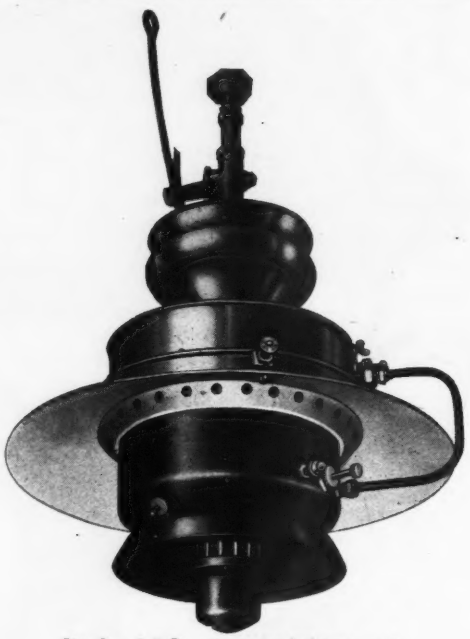

Fig. 3. A.R.P. gas street-lighting unit (Messrs. Wm. Sugg & Co., Ltd.).

a cylindrical silica diffuser and a clear glass cylinder, rendering it windproof. Light emerges through carefully predetermined slots, and the design is such that the optical arrangement cannot be disturbed in service. The conditions requisite for 10, 15, and 20-ft. mounting heights are already being met. A further unit, for special spacings between 50 ft. and 100 ft. will be available shortly. The device can be readily applied to other forms of lamps such as the "London," "Promenade," "Rochester," etc.

Fig. 4. B.T.-H. A.R.P. street-lighting unit.

The B.T.H. unit, illustrated in Fig. 4, utilises 15-watt Mazda pearl lamps for mounting heights of 9-14 ft. and 14-19 ft., and 25-watt lamps for heights of 19 ft. and upwards. A feature is the precision and accuracy of the design of the optical parts. Attention is drawn to the freedom from glare, the distribution is produced from secondary sources of low brightness, and the bare lamp is not visible from any point of view. The lantern is easy to erect and assemble. The robustness of design and use of die castings ensure meeting conditions, not only initially, but throughout the period of service.

In the design of the low intensity street lighting fitting produced by the Edison Swan Electric Company, Ltd., simplicity and ease of maintenance are claimed as important features. The Ediswan fitting contains two reflectors, constructed as a unit on the over lamp principle, and housing a 15-watt pearl lamp, the light-gap being masked to adjust light output to correspond with various mounting heights. Each fitting is marked with the mounting height for which it is intended. The reflector and cup forming the lower part of the fitting are so fixed that they can be quickly detached for lamp renewal and cleaning. A die-cast and tapped top at the head of the fitting facilitate fixing the unit direct into existing lanterns. Where this is impracticable a special type of adaptor for fixing into B.C., E.S., or G.E.S. lampholders, is available.

We also learn that, amongst others, Messrs. Siemens Electric Lamps and Supplies, Ltd., and the Wardle Engineering Co., Ltd., have been engaged in research on the preparation of a street lighting unit for war-time conditions. We hope to comment more fully on these and other units very shortly.

The Illuminating Engineering Society, (U.S.A.).

Notes on Transactions (December, 1939).

NEWS: The Technical Committee of the National Electrical Manufacturers' Association has developed so-called NEMA *Standards for Floodlighting*, distribution curves, and layouts for outdoor sports. The polo grounds near New York will be equipped this summer with a *floodlighting system of* 836 *floodlights* of 1,500 watt each. Eight steel towers will carry the lights 150 ft. above the ground. A new book by Professor James P. C. Southell, entitled *Introduction to Physiological Optics*, is being published by the Oxford University Press, N.Y.

SUBJECTS OF PAPERS: *General Secretary's Report*, 1938/39, by Howard M. Sharp. The gain in membership during the year was sixty-one, making the total per September 30 equal 2,745. Out of these 41.4% are engineers, 13.6% business executives, 29.9% salesmen, and 0.5% architects. The Society consists now of fourteen sections and six chapters. Short reports on the work of the twenty-four committees are added. Of special interest is the decision to change name and make-up of the "Transactions," which will be incorporated in a more comprehensive periodical under the title of "Illuminating Engineering."

Fluorescent Lamps and Their Applications, by A. B. Oday and R. F. Cissell. A summary is given of all relevant data in regard to the construction and application of the new standardised tubes. The wattage ranges from 15 to 40, the length from 17" to 47", the diameter from 1" to 1.5". Their rated life is stated as 2,000 hours. The efficiency is lowest for pink and blue, being 20 and 21 lm/w respectively, and highest for green (going up to 75 lm/w).

The Mechanics of Light Flux Control by Plastics, by M. H. Bigelow and A. F. Wakefield. The optical characteristics of thermosetting and thermoplastic materials are discussed. The thermoplastic materials are limited to applications where there is very little heat, and are ruled out for fixtures involving incandescent units, but have prospects in connection with fluorescent tubes. The thermosetting materials (amino-plastics), however, are foremost in lighting applications, and have good diffusion properties apparently due to their composition of rather irregular anisotropic particles. Reflection and transmission can be controlled by varying the opacity of the material with suitable pigments.

Lighting the Detroit Edison Company Service Building, by H. A. Cook. The paper refers to a new lighting installation specially designed in relation to ventilation. A feature is the provision of plaster coffers in the ceilings to act as reflectors made of plaster, pre-cast on the job, the surface being painted flat white. The lamps in general use are of the 300-watt bowl-silvered type, providing 50 ft.-c. on the desks. A bay equipped with nine coffers has a load of 2,700 watt, against 4,000 watt necessary with other systems. The illumination is extremely even, and the savings in maintenance and running costs (including air-conditioning plant) calculated at 5,000 dollars p.a.

Evaluation of Street Lighting, by Kirk M. Reid and H. J. Chanon. Data on road surface brightness under varying conditions, visibility and "fluctuating glare" are collected. A method of street lighting evaluation, based thereon, is suggested and specified.

Artificial Daylighting Studies, by Dorothy Nickerson. The importance of colour in handling agricultural products is investigated and the intensities and colour-revealing properties of natural and artificial daylight discussed.

Index to "Where to Buy"

N.B.—The numbers are those attached to individual entries in the Directory (See pp. 16—18)

Fig. 1. Typical A.R.P. Location Sign "A"

Fig. 2. Typical A.R.P. Direction Sign "B"

Mazdalux A.R.P. Signs

In our last issue (p. 247) we summarised British Standard Specification BS/ARP 32, for Standard A.R.P. Signs for Air Raid Shelters, Report and Control Centres, Wardens' Posts, Fire Stations, etc. The British Thomson-Houston Company, Ltd., have been quick to respond to the need for such signs and can make immediate deliveries, with standard lettering and complying with BS/ARP 32. We illustrate two typical signs, each equipped with two holders to take 15-watt Mazda lamps.

Window Lighting Box Fittings

Siemens Window Lighting Box Fitting

The subdued shop-window lighting, a concession to the Christmas trade, has been welcome to merchants, and is certainly also an aid to pedestrians in the darkened streets. In addition to the carefully designed cabinets described in BS/ARP 35, an improvised device utilising a 25-watt electric lamp in a box with a translucent slot was permitted. We illustrate such a device, now supplied by Siemens Electric Lamps and Supplies, Ltd., and costing only 3s. The descriptive leaflet contains clear instructions for the assembly of the device, which is of a very simple character. The largest lamp allowed to be used in the box is a 25-watt pearl. The box must be so located that no direct light shines outside the window, one fitting only being used for each 10 ft. width of window.

"As you grow up, Alfie, you'll realise we do a lot of things in this life that don't seem to make sense."

(Reproduced by permission of the proprietors of "PUNCH")

The Practical Use of Fluorescence

A very useful 24-page booklet under this title has been recently issued by Philips Lamps, Ltd. The first part of the book contains technical data. The chief sources of ultra-violet radiation, including the now familiar "black" lamps, are mentioned, and instances of materials fluorescing in various colours are given. The second part deals with applications which are varied and numerous. As well as its use for A.R.P. purposes (luminous signs, marking obstructions, in control rooms, etc.) fluorescence can be used with good effect for display in windows and showcases, theatres and cinemas. Finally, analysis by fluorescence has now many interesting applications.